



**Fermi National Accelerator Laboratory**

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## **Antiproton Noise Source for the Tevatron**

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# Antiproton Noise Source for the Tevatron

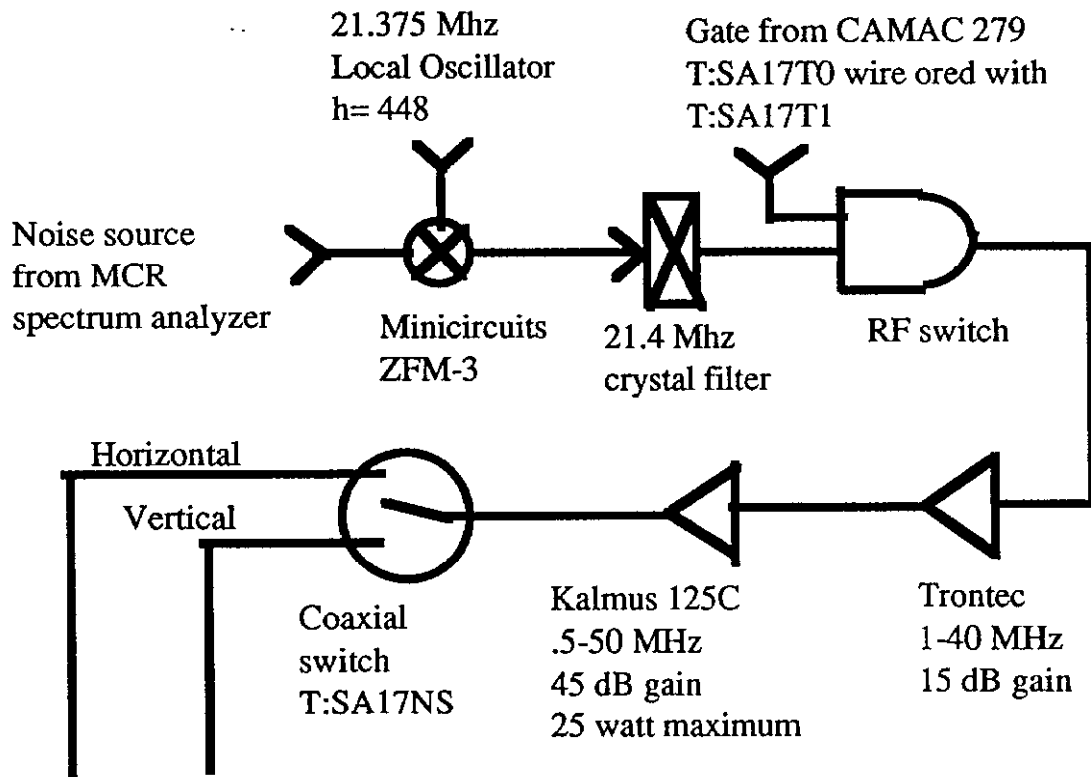
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## Introduction

A new system for exciting the beam in the Tevatron has been installed in the A1 service building and in the A17 medium straight section. The purpose of the system is to make betatron tune measurements.

## Block Diagram



Cables to tunnel Anzac H-1-4 180 hybrids, Tevatron BPMs  
and back upstairs to 50 watt terminations.

## Description of operation

The tune excitation system has been configured so that the attenuator in the Spectrum analyzer provides 40 dB of nearly linear excitation range. When the noise source is turned off, there is an

additional 30 dB decrease in the noise level at the output of the 25 watt power amplifier. Thus, the system does produce unwanted beam emittance growth when it is turned off. The timing channels can be disabled to further increase the isolation when the system is off. To excite antiprotons after cogging has occurred, timing channel T:SA17T0 is set to 154 RF cycles and timing channel T:SA17T0 is set to 336 RF cycles. Both channels are triggered on tevatron beam sync clock events \$AA, \$BB, and \$CC. Channel 1 should always be delayed from channel 0 by 182 RF cycles in order to produce six gate pulses for the six antiproton bunches per turn. Coaxial switch T:SA17NS is used to direct the noise to either the horizontal or the vertical standard tevatron BPM plates. At present horizontal is coded as "positive" in the parameter page basic control and status functions, and vertical is coded as "negative".

### Results of initial testing

The tune excitation system is capable of selectively exciting the antiproton schottky signals by 14 db. (see attached spectrum analyzer plots) The full power emittance growth rate is measured to be .71 pi-mm-mrad per 5 minutes. LOSTP and LOSTPB were quiet during the excitation.

Time of wire fly	vertical emittance pi-mm-mrad
10:46 pm (before studies)	18.1776
11:16 pm	20.4711
11:31 pm (before 5 min full on)	18.4009
11:50 pm (after 5 min full on)	20.3352
12:20 am	19.9603

